Environmental Guidelines

for Extreme Networks Switching Products

Abstract: This document provides environmental guidelines for temperature, humidity, dust, and airborne chemicals. Following these guidelines will help ensure that your Extreme Networks products will continue to operate reliably.

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Temperature and Humidity Guidelines

To ensure customer satisfaction and the continued reliable operation of Extreme Networks products, installers and operators must comply with the environmental guidelines described in the product documentation.

This document describes limits on operating temperature and humidity. Failure to operate the equipment in these prescribed ranges can result in reduced performance and damaged equipment. Failure to comply with these limits and guidelines can void the product warranty and can exclude the equipment from support entitlements of any applicable maintenance contract agreements.

Operating Temperatures

All equipment must operate within the prescribed temperature and humidity ranges specified in the product documentation. Operating the equipment outside these limits may result in damaged equipment and/or reduced performance and reliability.

Maintaining the proper temperatures might require reliable, monitored, 24x7 operation of climate control systems (heating and air conditioning).

Inlet Air Temperature Measurement

Operating temperature maximums and minimums are limited by the air temperature and by the amount of air entering the switching equipment. This area is located within one inch of the main equipment inlet. It is not necessarily the same as the air temperature measured elsewhere in the room.

Cooling Air

Many switches use side-to-side airflow for cooling. Careful consideration is needed when mounting this equipment. Proper ingress and egress spaces must be allowed to get fresh, cool air into the equipment and to allow hot exhaust air to exit away from the equipment.

Blocked venting can result in an overheating condition that can damage the equipment. Pay close attention to cable ingress and egress routing to verify that cabling does not block venting.

Power Conditioning

Extreme Networks products are rated to be used with internationally accepted AC input parameters. It is important that these parameters are monitored and verified to operate as expected for the ratings that apply to the equipment installed. Surges and excessive noise outside the prescribed ranges in the power circuits feeding your equipment can cause permanent damage to the equipment. Because of this, such conditions must be monitored and prevented.

Airflow Concerns for Closed Racks

When placing Extreme Networks switches into enclosed racks, consider using rack exhaust fans if the rack does not contain adequate inlet and exit venting. These fans might be needed to help exhaust hot air from the rack. They must be sized properly to exhaust the collective volumetric flow from all equipment within the rack.

Figure 1 illustrates the ideal configuration for a fully vented closed rack. All panels are vented, and side-to-side cooled subsystems are flowing in the same direction.

Be sure to allow cool air ingress through the bottom of the rack to enhance overall system airflow and prevent recirculation of stagnant air. You might need to perform thermal testing to confirm that air is flowing properly.

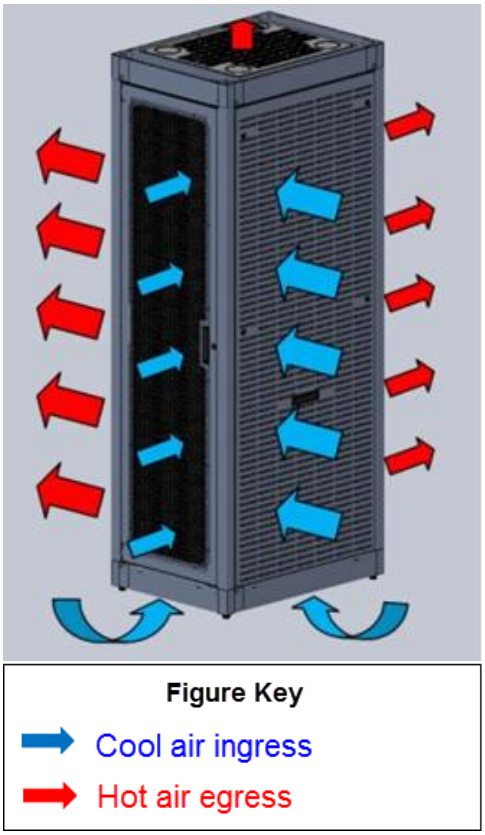

Figure 1. Ideal Configuration for a Closed Rack

Airflow Concerns for Open Racks

Equipment with different airflow cooling patterns, such as front-to-back or side-to-side, can present special concerns. Recirculation of heated air through equipment is undesirable because it increases the inlet temperature and causes the equipment to operate at high temperatures. Likewise, equipment in neighboring racks must be positioned so that hot air exhaust from one system is not pulled into the inlet of an adjacent system.

Figure 2 illustrates the ideal configuration for an open rack. All subsystems flow in the same direction, as shown by the white arrows.

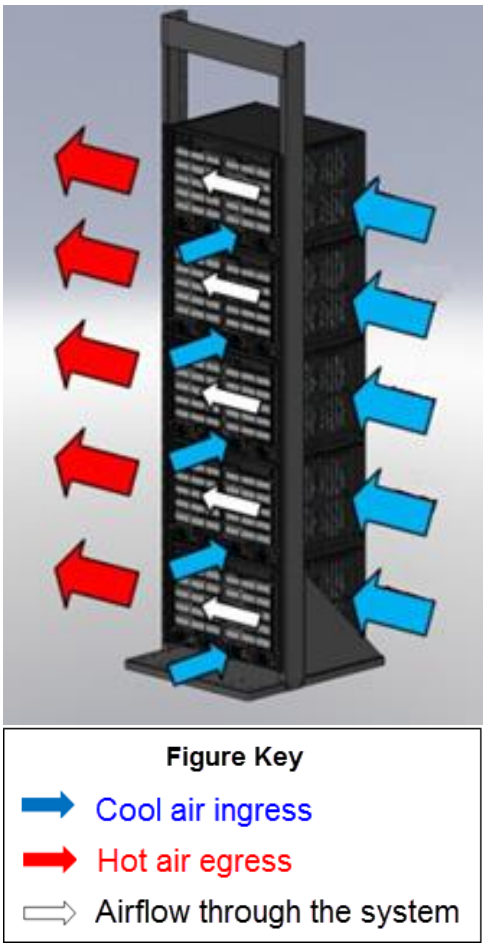

Figure 2. Ideal Configuration for an Open Rack

Figure 3 shows a non-ideal configuration for an open rack. Subsystems with mixed flow directions (white arrows) are combined in one rack. Circular red arrows show the potential for hot air recirculation.

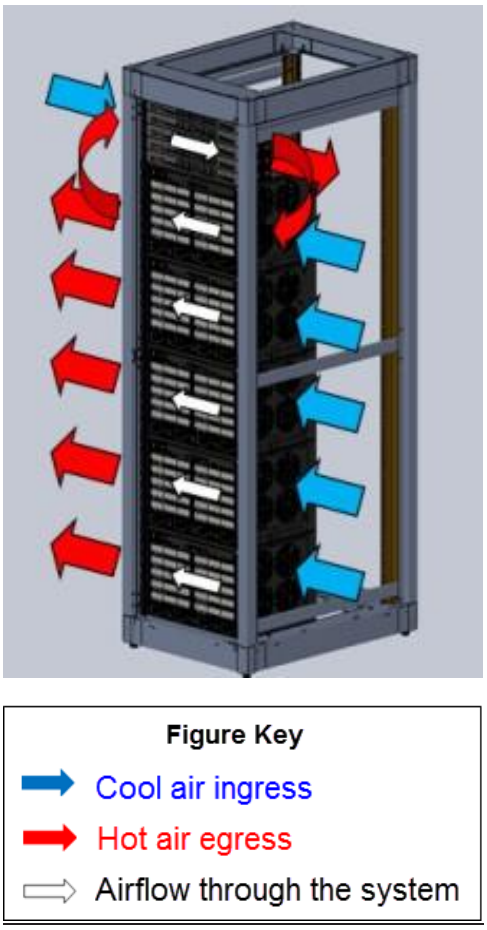

Figure 3. Non-ideal Configuration for an Open Rack

If you cannot avoid having non-ideal flows like these, they must be mitigated. You must then perform thermal testing to confirm that the mitigation is successful.

Figure 4 shows a non-ideal open rack configuration containing subsystems with mixed flow directions (white arrows). In this configuration, potential hot air recirculation has been mitigated by leaving a gap in the rack population.

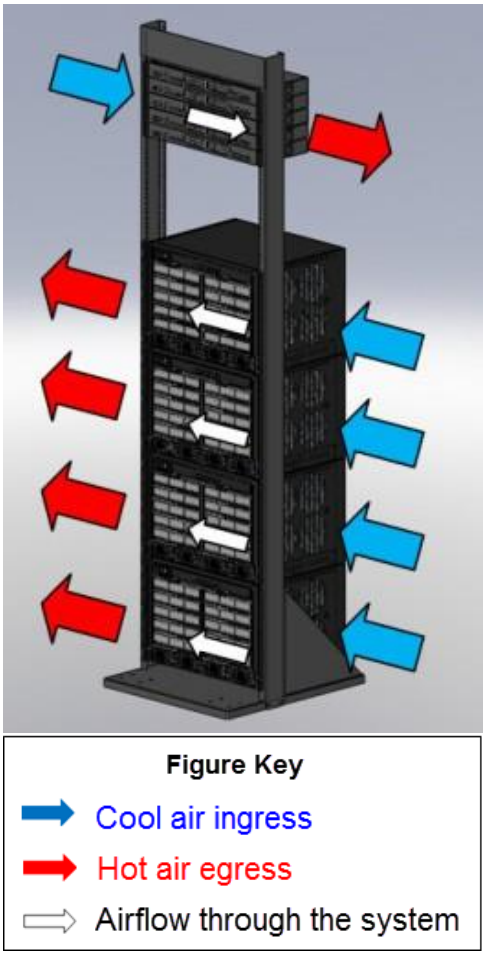

Figure 4. Mitigated Non-ideal Open Rack Configuration

Figure 5 shows another mitigation strategy for an open rack containing subsystems with mixed flow direction. Mitigation of potential hot air recirculation is achieved by placing components with front-to-back airflow patterns between the subsystems with differing flow directions.

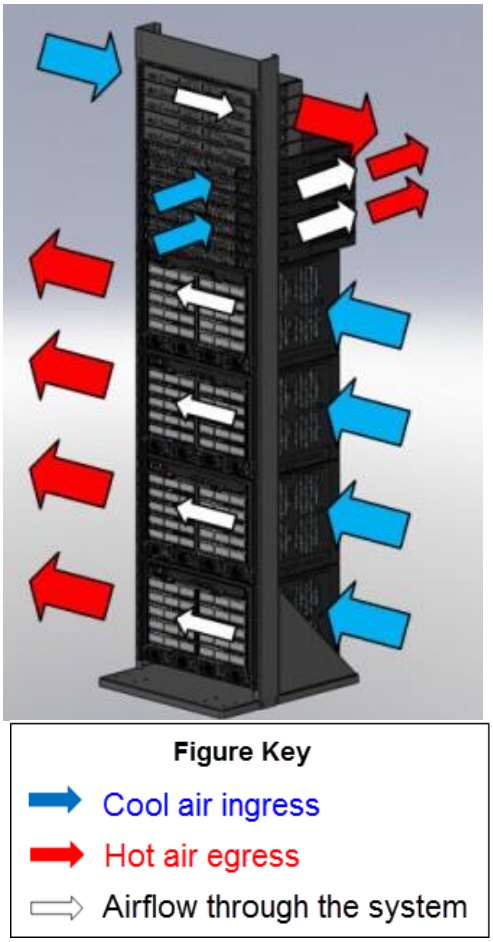

Figure 5. Alternative Mitigated Non-ideal Open Rack Configuration

Dust Mitigation and Prevention

Dust accumulation on ingress and egress venting is common after prolonged use.

We strongly recommend routine maintenance to check for clean ingress and egress vents. Over time, dust accumulation can create vent blockages, decreasing airflow and increasing component temperatures, resulting in reduced reliability. Recommended maintenance should start with monthly inspections and should be adjusted based on dust accumulation levels.

Table 1 notes the maximum dust and debris accumulation limits for room environments as a reference. Note that the equipment will operate at higher dust levels than listed here. However, operating at higher levels can decrease the equipment's service life.

Table 1. Airborne Dust Specifications for Extreme Networks Switching Equipment

Dust Quantity	Guidelines
All/Total Airborne Particles (TSP- Dichot 15) *	Maximum: 20 µg/m^3 †
PM10/Coarse Particles (2.5 to 15 microns)	Preferred: < 10 µg/m^3 † Maximum: 20 µg/m^3 ‡
PM2.5/Fine particles (< 2.5 microns)	Maximum: 10 µg/m^3 ‡
Notes: * TSP-Dichot 15 = Total suspended particulates as determined using a dichotomous sampler with a 15-micron inlet † Value from NEBs GR-63-CORE issue #3 table 4-12 ‡ Recommended value by WHO (World Health Organization) for 2005 air quality	

Removing dust from the equipment is a required part of maintenance. When you remove dust:

- Use proper precautions for electrostatic discharge (ESD).
- Use a vacuum cleaner that is properly grounded through a cord having an equipment-grounding conductor and grounding plug.

Carefully vacuum the dust particles from the inlet and exit venting of the equipment to allow for proper airflow and ventilation.

Contact the Extreme Networks Global Technical Assistance Center for additional information about external filter options.

Airborne Chemicals and Prevention

Various airborne chemicals and contaminants can cause corrosion and thus decrease the service life of most vendors' equipment. To reduce the risk of such corrosion, locate the equipment only in areas that are safe for long-term human occupation.

For more information, refer to the documentation for your product.

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